



**Frauenhof**  
Industriebedarf und Umwelttechnik

# Sewer Cleaning and Rehabilitation



Hoses  
Nozzles  
Shortliners  
Longliners  
Packers  
Accessories



Hugo Frauenhof GmbH  
Industrial Supplies and Environmental Technology  
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**Entry into the Commercial Register**

Registration Court: Amtsgericht Düsseldorf  
Registration Number: HRB 45421

**Tax ID Number**

According to §27a UStG  
DE 121 387 379



# Hugo Frauenthor





Dear business partner,

welcome to the product offering at Hugo Frauenhof GmbH!

We are a family-run enterprise with a tradition of more than 130 years, selling products for technical wholesale and industrial needs worldwide. Our core business is characterized by environmental technology and, in particular, hose technology. There is a good reason to focus on two directions:

### The past and the future.

Since the beginning of our journey in 1887, we have been moving on with both a sense of tradition and a love for innovation. Once started as a family business in Hilden, Germany, we achieved scale and have become a flexible, growing, and global company with the highest quality standards for our products and ourselves. This is what we have internalized in our DNA and codified in our mission statement. Feel free to take a look at it!

Our success is based upon a formula that combines entrepreneurial foresight and experience over several generations: The ability to change, the willingness to take risks, continuity and commercial discretion. We are proud of our achievements!

However, this success neither had been possible in the past nor will be possible in the future without the intensive and long-term cooperation with our trusty and loyal customers, suppliers and employees.

We look forward to maintaining our long-standing relationships with commercial partners and establishing new ones in the future!

Thank you very much for your trust!

Petra Osten-Laschet

Walter Laschet

Sascha-Dominique Laschet

Fabio-Yannick Laschet



# Introducing Ourselves

Highest Quality Since 1887  
Our Mission Statement  
Our Services for You

**01**

## Sewer Cleaning

### Hoses

Sewer Cleaning Hoses  
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# Sewer Rehabilitation

## Shortliners



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## Longliners



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## Packers



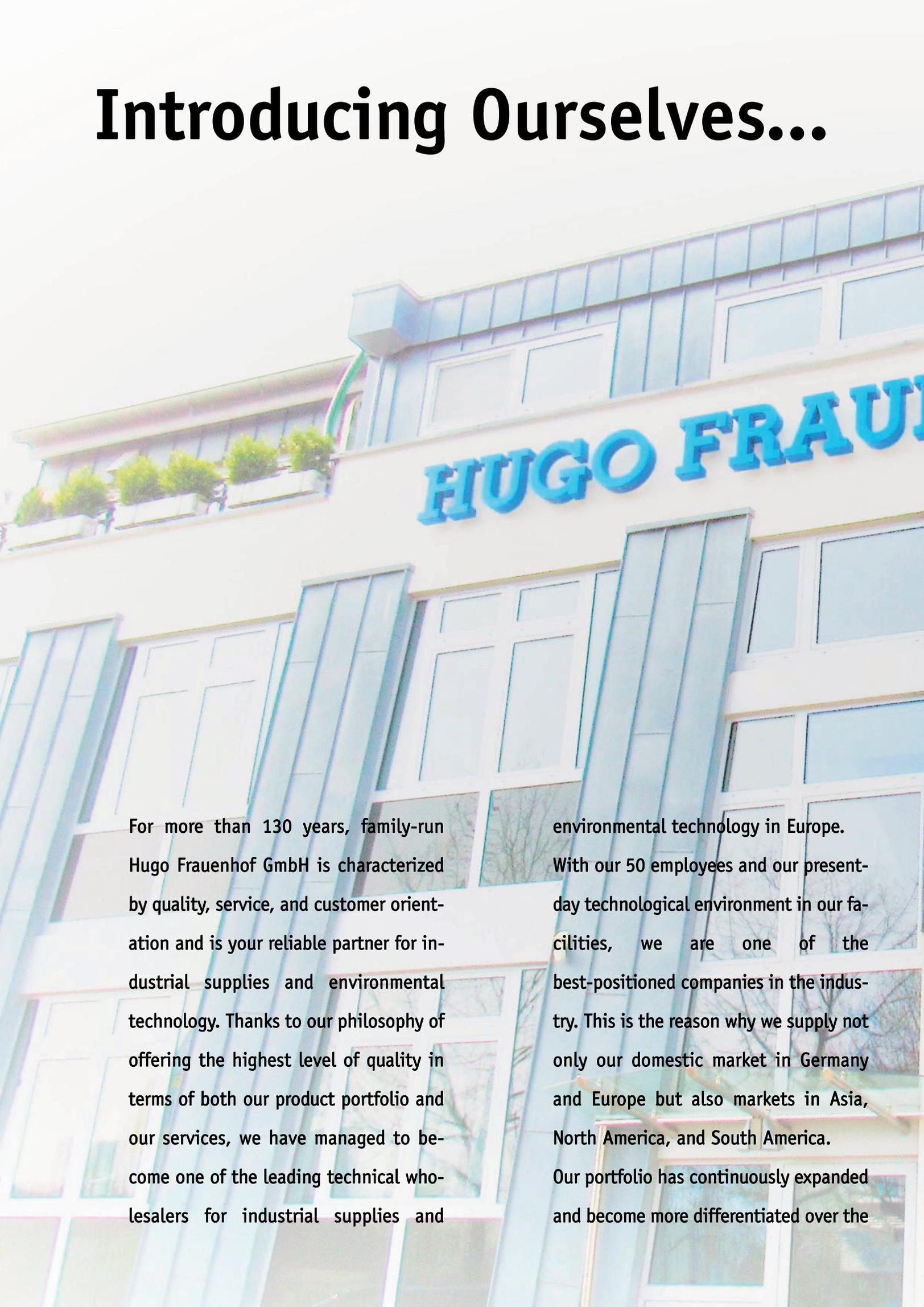
62

## Accessories



70

# Introducing Ourselves...



HUGO FRAUENHOF

For more than 130 years, family-run Hugo Fraunhofer GmbH is characterized by quality, service, and customer orientation and is your reliable partner for industrial supplies and environmental technology. Thanks to our philosophy of offering the highest level of quality in terms of both our product portfolio and our services, we have managed to become one of the leading technical wholesalers for industrial supplies and

environmental technology in Europe. With our 50 employees and our present-day technological environment in our facilities, we are one of the best-positioned companies in the industry. This is the reason why we supply not only our domestic market in Germany and Europe but also markets in Asia, North America, and South America. Our portfolio has continuously expanded and become more differentiated over the



# ENHOF

course of time. Sewer cleaning technology, hose technology and ultra high pressure technology define the core of our services. These services are moreover enriched by sewer rehabilitation, air handling systems accessories and occupational safety.

With our highly diversified assortment and our utmost focus on quality, it is our motivation to work out customer-specific solutions for your problems and,

in doing so, providing you with a competitive advantage. Along the whole process, our highly qualified and well trained team is happy to be at your side and support you with your needs and wishes.

Our portfolio includes...

### Sewer and pipe cleaning technology

Sewer cleaning hoses  
Cassette boom hoses  
Nozzles  
Sewer cleaning equipment

### Hose and coupling technology

Suction and pressure hoses  
Tank waggon and chemical hoses  
Flat hoses  
Air conveyor system hoses  
Couplings

### Ultra High Pressure Technology

Thermoplastic UHP hoses  
UHP rubber hoses  
Adapters and connectors  
Protective clothing  
Occupational safety  
Accessories

Our location in Hilden is close to the German Autobahn A3 and A46 and characterized by its comprehensive warehouse. With a storage area of more than 2,600 m<sup>2</sup>, a fast delivery is guaranteed, enabling us to support you even in short-term cases of need, so that you can continue your activities without a major loss of downtime.



### Sewer rehabilitation and testing

Sewer rehabilitation  
Resins  
Fiberglass material  
Inversion lining systems and sites  
Rehabilitation packers  
Test pipe sealing cushions  
Sewer testing systems  
Equipment

### Air Conveyor System Technology

Rubber hoses  
PVC hoses  
PU hoses  
Blowing hoses  
Coupling systems

### Personal protective equipment (PPE)

Protective clothing  
Occupational safety  
Barriers / Job site safety  
Respiratory protective equipment  
Gas measurement technology / Self protection  
Entry protection devices  
Lamps



As a family-run enterprise with a flat hierarchical structure, we are able to respond to your questions and requests quickly and with great flexibility. The ongoing dialogue and exchange with our customers, suppliers and business partners provides both you and us with a strong foundation of future success and progress. In order to ensure sustainable success and progress, investments in the most recent and particularly resource-saving technologies are indispensable. Hence, we do not only invest in continuously advancing our technical equipment and facilities, but also cover most of our energy supply with renewable energies, such as photovoltaic systems.

# Highest Quality



Mr. Theodor Hugo Frauenhof founds the company, by name "Feingeberei und Schäftefabrik"



Mr. Gottfried Osten joins the company

With Susanne Frauenhof as general partner and Mr. Gottfried Osten as limited partner, the company operates as Frauenhof KG

1887

1957

1965

1992

1945

1958

1995

The company expands into technical wholesale and industrial supplies

The company expands into environmental technology, including the sale of hoses, armatures, and assembly of hose lines

Sole takeover of the owner's shares by Mr. Osten

Construction of a new office and warehouse building with a storage area of 1000m<sup>2</sup> in Hilden, the company's current location



# since 1887



Ms. Ingrid Osten and Mr. Walter Laschet become part of the company's management

1998



2001

Construction of a second warehouse, adding 1100m<sup>2</sup> of storage area



Today's majority shareholder Ms. Petra Osten-Laschet becomes part of the company's management. With the construction of a third warehouse, an additional 420m<sup>2</sup> of storage space is added.

2007



Ms. Petra Osten-Laschet becomes the majority shareholder; termination of our business activities in the area of shoemaker supplies (2013)

2013



Expansion of the photovoltaic system, including an industrial storage system and expansion of the storage area

2012

At its 125<sup>th</sup> anniversary, the company changes its appearance and returns to the roots "red / black becomes blue / silver again"

2014

Completion and initial operation of a photovoltaic system meeting the company's whole energy demand



2018

# Our Mission Statement

## Customers

„**Customers** are the focal point of all our actions. To satisfy our customers’ needs and wishes, we provide them with a maximum of **product quality** as well as **safety, responsibility** and services.

It is our ambition to understand our customers better than the competition does. This is the only way to guarantee our exceptional **service**.“

## Quality Leadership

„It is our ambition to provide our customers with a maximum of **quality**. Our definition of quality requests to exceed our customers’ expectations and hence goes beyond merely satisfying their needs, expectations, and requests.

Our objective is to assume the role of the **quality leader** in the market.

Quality is what we are known for.“

## Being Exceptional is Our Benchmark

„We are not satisfied with standard solutions. We are strongly committed to adjust our products to our customers’ needs. Providing our customers with **individual** and **customized** solutions is the only way to satisfy their needs.

There is no customer request that is too **special** for us to deal with.“

## Flexibility and Agility

„Due to our flat hierarchical structure, we are able to make decisions and find solutions **quickly**. Being able to react to new problems and requirements with great **flexibility**, we achieve the optimal solutions for our customers.“

## Individualism and Team Mentality

„Our employees stand out due to their **professional competencies, qualification** and **motivation**. Yet, they can provide our customers with an optimal service level if and only if they work together as a team. Hence, our success is based on a strong team characterized by **individual** personalities.“

## Trust and Responsibility

„We **value, challenge** and **develop** our employees. We treat one another with **dignity, respect** and **trust**. To secure the success of our company, we expect each employee to act responsibly and show a strong commitment.“

## Passion and Pride

„Every day, our employees show strong **dedication** and **passion** to ensure the well-being of our customers. Our employees are characterized by a strong commitment and motivation. They represent our company with **pride** and **pleasure**.“

## A Tradition of Being Innovative

„Stagnancy has no place in our company, as it a step backwards. Our tradition of more than 125 years has always been characterized by an orientation towards the future. Always focused on **innovation** and application of the most **recent technologies**, we want to provide our customers with optimal solutions. Hence, we invest in new technical systems and operational structures.“

## Sustainability

„We are committed to using natural and financial resources responsibly in order to ensure the company's **future** success. We establish sustainable solutions in the areas of **environmental protection** and **finance**. Our environment is highly important to us. To protect the environment, we invest in sustainable and energy-saving technologies.“

## Ethics and Integrity

„We commit ourselves to actions that are **morally** right and curate our **values**. Integrity is focal to our understanding of morality and ethics. **Respect, tolerance** and **acceptance** of human beings, irrespective of gender, origin, and religion is a matter of course for us and defines the foundation of our actions. For this reason, we are highly committed to create **social** value.“

## Suppliers

„We choose our **suppliers** based on our understanding of honesty, fairness, partnership and integrity. This is the only way to adhere to our strong **quality standards** to a high degree.“

## Data Protection

„**Protecting** and handling your personal data in a responsible and confidential way is our duty that we conform to without restriction. We apply the guidelines of the **General Data Protection Regulation (GDPR)** to the full extent.“

# Our Services for You

As one of our customers at Hugo Frauenhof GmbH, you enjoy our services to the full extent. Thanks to our extensive storage capacity and huge workforce, we respond to your needs and wishes as quickly as possible.

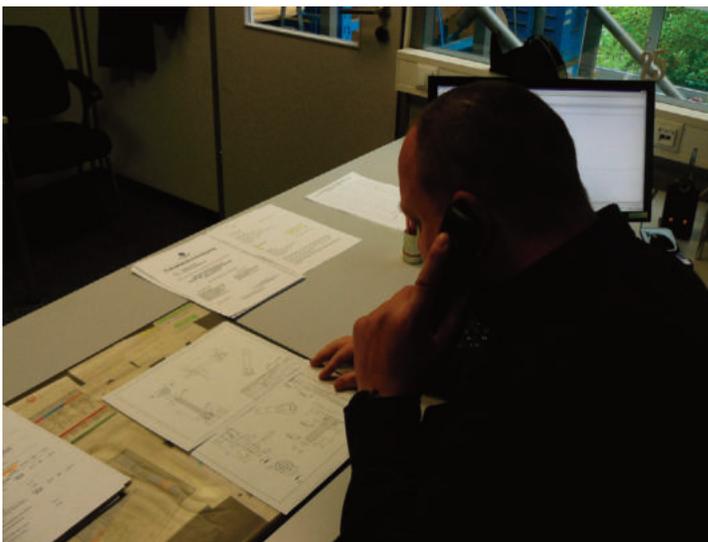
## Readiness for Delivery

Due to our logistic partners and own delivery vehicles, we are capable of delivering in less than 24 hours and respond to cases of need immediately. If you are interested, you also have the option to pick up your goods at our location. On request, we send your order to your customers immediately. In case of deliveries abroad, we are happy to handle customs clearance for you at no additional cost.



## Sales

Always happy to answer your questions and support you with offers and requests, our internal sales staff is available for you from Monday to Thursday (8:00 a.m. - 5:00 p.m.) and on Fridays (8:00 a.m. to 2:30 p.m.). In case you need personal advice on site, our field staff will be happy to assist you.



## Ultra High Pressure Services

Thanks to our three ultra-high-pressure test stands, we are able to inspect ultra-high-pressure lines up to 6,000 bar and issue you a test certificate. Certificates about all HFH-manufactured hoses are saved in-house and can be made available to you at a later date upon request. At your request, our in-house laser furthermore allows us to engrave ultra high pressure lines.

Moreover, our highly-skilled and experienced staff is happy to offer training in the area of ultra-high-pressure solutions.



## Advisory & Problem Solving

With more than 130 years of experience, we are happy to be by your side as a competent partner. As accepting every challenge is part of our long-standing tradition, we are happy and look forward to managing individual problems together with you and providing you with custom-made solutions.



# Sewer Cleaning



We deliver our sewer cleaning hoses to you ex works as a final product – reinforced with couplings and comprehensively tested at our site. In accordance with BGR 500-2.36, we furthermore embed the hoses in our assembly department in a professional way.

In case of on-site repairs, we can provide you with both appropriate replacement couplings and assembly presses with the appropriate die stocks.

Moreover, our assortment inter alia includes cassette boom hoses, sewer cleaning nozzles and accessories for your sewer cleaning needs.

As a matter of course, all of the products we offer are sourced from high quality and reliable suppliers who commit to the strictest quality assurance procedures in their production.

**To make sure you are able to  
clean the sewers properly...**

# Legend



**Outside Diameter**



**Inside Diameter**



**Burst Pressure**



**Weight**



**Working Pressure**



**Screw Thread**



**Bend Radius**



**Length**



# Hoses

**Sewer Cleaning Hoses**

**Cassette Boom Hoses**

**Mobile Hose Press**

# Canalkler 250 S



This ultra high pressure hose is used in sewer and pipe cleaning. It is characterized by the texture of its extremely smooth upper cover in particular. As a result, both its abrasion value and its sliding behavior are highly valued performance characteristics of its users. They are definitely the benchmark defining what is currently feasible.

The 250 S is manufactured in accordance with the regulations of the trade association (ZH1 / 406).

- Temperature range: -35°C to 80°C
- Inner tube: SBR black, smooth
- Pressure carrier: 2 braided textile inserts
- Cover: NR/BR black, smooth

Nominal width						
<b>DN 13</b>	13.0 mm	25.6 mm	250 bar	625 bar	70 mm	0.45 kg/m
<b>DN 19</b>	19.0 mm	31.6 mm	250 bar	625 bar	90 mm	0.61 kg/m
<b>DN 25</b>	25.0 mm	39.3 mm	250 bar	625 bar	100 mm	0.9 kg/m
<b>DN 32</b>	32.0 mm	47.6 mm	250 bar	625 bar	130 mm	1.12 kg/m
<b>DN 38</b>	38.0 mm	54.0 mm	250 bar	625 bar	155 mm	1.35 kg/m

## Article Numbers:

Length / Nominal width	20m	40m	60m	80m	120m	150m	160m	180m	200m	220m	240m
<b>DN 13</b>	282623	282040	282042	282044	282046	-	-	-	-	-	-
<b>DN 19</b>	-	282048	282612	282050	282052	-	-	-	-	-	-
<b>DN 25</b>	-	282054	282613	282056	282058	-	282060	282062	282201	-	281978
<b>DN 32</b>	-	282064	282614	282066	282068	-	282070	282072	282663	-	-
<b>DN 38</b>	-	282074	-	282076	282078	282080	-	-	-	-	-

All the hose lines listed in the table are fully and properly integrated with fittings.

# Semperit IK 25



This ultra high pressure hose is used in sewer and pipe cleaning purposes. Due to its outstanding price-performance ratio, it is one of the most attractive hoses on the market. It is characterized by both its weather-resistant hose cover and its particularly corrosion-resistant fittings. These properties provide the product from the house of Semperit with a high wear protection.

The IK 25 is manufactured according to the regulations of the occupation cooperative (ZH1/406).

- Temperature range: -35°C to 80°C
- Inner tube: SBR black, smooth
- Pressure carrier: 2 braided textile inserts
- Cover: NR/BR black, smooth

This hose can also be manufactured as a front hose on all sizes.

Nominal width						
<b>DN 13</b>	13.0 mm	25.0 mm	250 bar	625 bar	70 mm	0.46 kg/m
<b>DN 19</b>	19.0 mm	31.0 mm	250 bar	625 bar	90 mm	0.61 kg/m
<b>DN 25</b>	25.0 mm	39.0 mm	250 bar	625 bar	110 mm	0.86 kg/m
<b>DN 32</b>	32.0 mm	48.0 mm	250 bar	625 bar	150 mm	1.27 kg/m

## Article Numbers:

Length / Nominal width	20m	40m	60m	80m	120m	160m	180m	200m	220m	240m
<b>DN 13</b>	286028	286000	286001	286002	286003	-	-	-	-	-
<b>DN 19</b>	-	286004	286027	286005	286006	-	-	-	-	-
<b>DN 25</b>	-	286007	.	286008	286009	286010	286011	286030	286012	286031
<b>DN 32</b>	-	286013	286013	286014	286015	28016	286017	-	-	-

All the hose lines listed in the table are fully and properly integrated with fittings.

# Parker ESH 250 - Canaljet Plus 2



This ultra high pressure hose is used for sewer and pipe cleaning purposes. The CanalJet Plus 2 has a weight saving of 30% compared to other rubber sewer cleaning hoses. The particular polyurethane mixture is characterized by excellent abrasion values, cut resistance and a homogeneous bond between not only used materials for the inner and outer layer but also pressure carriers. The CanalJet Plus 2 is moreover characterized by its resistance to hydrolysis, ozone, UV and microorganisms.

- Temperature range: -10°C to +50°C
- Inner tube: Thermoplastic elastomer
- Pressure carrier: 2 braidings of highly tear-resistant synthetic fibers (homogeneously connected to one another)
- Cover: Polyurethane, green, extremely cut- and abrasion-resistant

Please note that the hose “floats”.

Nominal width						
<b>DN 13</b>	12.0 mm	21.2 mm	250 bar	625 bar	1000 mm	0.24 kg/m
<b>DN 19</b>	20.0 mm	28.6 mm	250 bar	625 bar	125 mm	0.40 kg/m
<b>DN 25</b>	25.0 mm	36.5 mm	250 bar	625 bar	150 mm	0.60 kg/m
<b>DN 32</b>	32.0 mm	46.0 mm	250 bar	625 bar	225 mm	1.00 kg/m

## Article Numbers:

Length / Nominal width	80m	120m	160m	180m	200m	240m
<b>DN 13</b>	281805	281806	281807	281808	-	-
<b>DN 19</b>	281809	281810	281811	281812	-	-
<b>DN 25</b>	281813	281814	281815	281816	-	281817
<b>DN 32</b>	281818	281819	281820	281821	281822	281823

Available on request up to a length of 400 m, contingent on the measurements.

# HFH Cassette Boom Hoses



The HFH cassette boom hose is suitable for suction vehicles of all superstructure manufacturers, with the exception of Assmann and Müller Umwelttechnik. For those superstructures, we offer customized cassette extension hoses.

The working pressure of HFH cassette boom hoses is 3 bar and the burst pressure is 9 bar. The cassette boom hose is suitable for full vacuum. It is equipped with two hidden, reinforcing spirals, spiral-free cuffs on both sides and one-sided cuff extensions in dimensions 102 and 12. The hose is partly oil-resistant by default, oil-resistant version on request only.

- Temperature range: -30°C to +90°C
- Inner tube: NR/NBR synthetic rubber, abrasion-resistant, smooth, black
- Cover: NR/NBR synthetic rubber, abrasion-resistant, smooth, black

Article no.	∅	∅			Cuff extensions
<b>281489</b>	102mm	122mm	16m	550mm	110mm
<b>281490</b>	102mm	122mm	20m	550mm	110mm
<b>281491</b>	127mm	147mm	20m	660mm	133mm
<b>281492</b>	127mm	147mm	25m	660mm	133mm
<b>281493</b>	152mm	172mm	20m	770mm	None



# HFH Special Cassette Boom Hoses



The HFH special cassette boom hose has the same wearing surface, but a smaller outside diameter. It is therefore suitable for suction vehicles of superstructure manufacturers Assmann and Müller Umwelttechnik.

The working pressure of HFH special cassette boom hoses is 3 bar and the burst pressure is 9 bar. The cassette boom hose is suitable for full vacuum. The bend radius corresponds to the fourfold up to the fivefold hose diameter. It is equipped with two hidden, reinforcing spirals and spiral-free cuffs on both sides.

- Temperature range: -30°C to +90°C
- Inner tube: NR/NBR synthetic rubber, abrasion-resistant, smooth, black

Article no.	Dimension	
282488	DN 102 x 8	20m
282489	DN 102 x 8	25m
282486	DN 127 x 9	20m
282487	DN 127 x 9	25m



# Aspikler N



The Aspikler N is a suction hose for purposes of cassette boom operation on sewer cleaning vehicles. The hose is characterized by its high abrasion resistance and its flexibility even if low temperatures are involved.

- Temperature range: -30°C to +80°C
- Inner tube: SBR, black, smooth, electrically conducting, not resistant to oil
- Casing: synthetic inserts with spring steel spirals
- Cover: SBR, black, not resistant to oil, abrasion-resistant, smoothly textile patterned

Article no.							
<b>281969</b>	100 mm	116.5 mm	6 bar	15 bar	450 mm	4.30 kg/m	20 m
<b>281359</b>	125 mm	144.0 mm	6 bar	15 bar	550 mm	6.30 kg/m	20 m
<b>281360</b>	150 mm	170.0 mm	6 bar	15 bar	650 mm	7.77 kg/m	20 m

# Mobile Hose Press KarryKrimp 1

Mobile Hose Press KarryKrimp 1 provides you with a safe assembly system allowing you to mount hose lines on site quickly and easily. It is a portable hose press that is easy to use by anyone. It is an economically viable alternative for self-assembly of hoses and fittings made by Parker and can also be used for rubber suction hose Trelleborg Canalkler 250 S with a nominal weight of DN 12.

Article-No.: 240285



# Mobile Hose Press KarryKrimp 2

Mobile hose press KarryKrimp 2 is the secure assembly system that allows you to mount hose lines easily and quickly. Karry Krimp 2 is a portable hose press that is easy to use by anyone. It represents an economically viable alternative for purposes of self-assembly of hoses and fittings made by Parker.

The following hose types can be grouted:

- 1 SN hoses up to size 20 (DN32)
- 2 SN hoses up to size 20 (DN32)
- Compact hoses with 1 and 2 layers up to size 20 (DN 32)
- Compact hoses with 3 layers up to size 16 (DN 25)
- SAE 100 R12 hoses up to size 20 (DN 32)
- SAE 100 R13 hoses up to size 16 (DN 25)
- 4SP hoses up to size 16 (DN 25) according to EN 866
- 4SH hoses up to size 16 (DN 25) according to EN 856
- Canalkler 250 S DN 32

Article-No.: 240288



We are happy to provide you with assembly instructions for our sewer flushing hoses.

# Mobile Hose Press Minikrimp

The safe assembly system in order to mount hose lines on site easily and quickly. The Minikrimp is a portable, lightweight and one-piece press. These characteristics provide the minikrimp with a valuable advantage compared to other presses. This press is easy to transport, can be attached to the vehicle bench vise and is a cost-effective way to manufacture hose lines on site. It is suitable for grouting sewer cleaning hoses ESH 250 Canaljet Plus and Plus 2 with nominal widths DN 13 to DN 32 and the Canalkler 250 S with nominal widths DN 13 to DN 25.

## Your advantages:

- Small, lightweight and compact
- Authoritative and independent
- Easy to use
- Extremely strong
- Stable and portable
- Close at hand
- At a glance
- Easy to transport

Article-No.: 240271



Article no.	Description	Nominal width
240272	Set of die stocks Minikrimp KU	DN13
240273	Set of die stocks Minikrimp KU	DN20
240274	Set of die stocks Minikrimp KU	DN25
240275	Set of die stocks Minikrimp KU	DN32
240276	Set of die stocks Minikrimp KU	DN13
240277	Set of die stocks Minikrimp KU	DN20
240278	Set of die stocks Minikrimp KU	DN25



# Nozzles



# 1/8" Nozzles

Article no.	Description	Bore				
120112	Tubular nozzle CSN012	1x ZS 3x RS	1/8" IG	300 bar	18 mm	16 mm
120212	Rotating nozzle CRTK012	2x TS 2x RS	1/8" IG	300 bar	30 mm	16 mm



120112



120212

# 1/4" Nozzles

Article no.	Description	Bore				
120110	Tubular nozzle CSN025	3x RS	1/4" IG	300 bar	22 mm	18 mm
120110-V0	Tubular nozzle CSN025	1x ZS 3x RS	1/4" IG	300 bar	22 mm	18 mm
120163	Rotating nozzle RTH025	4x RS	1/4" IG	300 bar	56 mm	28 mm
120213	Rotating nozzle CRTK025	2x TS 2x RS	1/4" IG	300 bar	30 mm	16 mm
120214	Rotating nozzle RTK025	2x TS 2x RS	1/4" IG	300 bar	56 mm	28 mm
120157	Rotating nozzle RTS025	4x TS	1/4" IG	300 bar	56 mm	28 mm
120169	Rotating nozzle RTV025	4x VS	1/4" IG	300 bar	56 mm	28 mm
120119	Pocking nozzle CCP025	1x ZS 3x VS 4x RS	1/4" IG	300 bar	33 mm	18 mm
120125	Pull nozzle CGB025	6x RS	1/4" IG	300 bar	39 mm	30 mm



120213



120125



120214



120163



120157



120169



120110



120110-V0



120119

# 1/2" Nozzles

Article no.	Description	Bore				
120260	Grenade GB50	1x ZS 6x RS	1/2" IG	300 bar	80 mm	50 mm
120081	Grenade GB50	1x ZS 6x RS	1/2" IG	300 bar	115 mm	70 mm
191011	Chain sling spider case set SP50SET	3x TS 3x RS	1/2" IG	300 bar		
120105	Tubular nozzle KR50/6K	1x ZS 6x RS	1/2" IG	300 bar	40 mm	30 mm
120433	Tubular nozzle SN50	1x ZS 3x RS 3x RS	1/2" IG	300 bar	53 mm	30 mm
120106	Tubular nozzle KR50/8K	1x ZS 8x RS	1/2" IG	300 bar	40 mm	30 mm
120164	Rotating nozzle RTH050	4x RS	1/2" IG	300 bar	80 mm	40 mm
120215	Rotating nozzle RTK050	2x TS 2x RS	1/2" IG	300 bar	80 mm	40 mm
120440	Pocking nozzle CP050	1x ZS 3x VS 3x RS	1/2" IG	300 bar	57 mm	35 mm
120115	Pocking nozzle Q50	1x ZS 3x VS 6x RS	1/2" IG	300 bar	55 mm	30 mm
120239	Twister AD12	1x ZS 6x RS	1/2" IG	300 bar	65 mm	40 mm
120137-3	Nozzle with front jet VDR050	1x ZS	1/2" IG	300 bar	50 mm	30 mm
120137-5	Nozzle with front jet VDR050	1x ZS	1/2" IG	300 bar	50 mm	30 mm
120079	Pull nozzle	1x ZS 5x RS	1/2" IG	300 bar	55 mm	50 mm



120260



120081



120105



120433



120106



120164



120215



120079



120137-3



120137-5



120440



120115



120239



191011

# 3/4" Nozzles

Article no.	Description	Bore				
120078	Grenade GB075	1x ZS 8x RS	3/4" IG	300 bar	103 mm	55 mm
120751	Chain sling SP60/075	3x TS 4x RS	3/4" IG	300 bar	150 mm	80-150 mm
120435	Tubular nozzle SN075	1x ZS 6x RS	3/4" IG	300 bar	60 mm	35 mm
121518	Tubular nozzle CSN075LT	1x ZS 6x RS	3/4" IG	300 bar	60 mm	35 mm
120272	Rotating nozzle RTH075L	4x RS	3/4" IG	300 bar	79 mm	40 mm
120746	Rotating nozzle RTK075HT	2x TS 5x RS	3/4" IG	300 bar	95 mm	60 mm
120224	Rotating nozzle RTK075L	2x TS 2x RS	3/4" IG	300 bar	78 mm	40 mm
120183	Rotating nozzle RTS075H	4x TS 3x RS	3/4" IG	300 bar	95 mm	60 mm
120646	Rotating nozzle RTS075	4x TS 3x RS	3/4" IG	300 bar	80 mm	50 mm
120441	Pocking nozzle CP075	1x ZS 3x VS 3x RS	3/4" IG	300 bar	72 mm	40 mm
121520	Pocking nozzle CCP075LT	1x ZS 3x VS 3x RS	3/4" IG	300 bar	73 mm	40 mm
120139	Nozzle with front jet VDR075	1x ZS	3/4" IG	300 bar	70 mm	60 mm



120183



120746



120646



120224



120272



120751



120441



121520



120435



121518



120078



120139

# 1" Nozzles

Article no.	Description	Bore				
120396	Bulldozer BU100/SP	8x RS	1" IG	300 bar	410 mm	185 mm
120302	Bulldozer BU100	10x RS	1" IG	300 bar	550 mm	240 mm
120088	Grenade GB100	10x RS	1" IG	300 bar	185 mm	100 mm
120077	Grenade S100/1	1x ZS 8x RS	1" IG	300 bar	115 mm	80 mm
121075	Grenade GB100L	1x ZS 10x RS	1" IG	300 bar	140 mm	80 mm
120087	Grenade G100/2	1x ZS 8x RS	1" IG	300 bar	180 mm	80 mm
121085	Grenade G100/1	1x ZS 6x RS	1" IG	300 bar	170 mm	75 mm
120787	Plug nozzle TB80	10x RS	1" IG	300 bar	180 mm	80 mm
120417	Plug nozzle TB120	14x RS	1" IG	300 bar	205 mm	110 mm
121519	Tubular nozzle CSN100	1x ZS 8x RS	1" IG	300 bar	78 mm	50 mm
120436	Tubular nozzle SN100	8x RS	1" IG	300 bar	78 mm	50 mm
120166	Rotating nozzle RTH100H	7x RS	1" IG	300 bar	175 mm	100 mm
120165	Rotating nozzle RTH100	7x RS	1" IG	300 bar	95 mm	60 mm
120225	Rotating nozzle RTK100T	2x TS 5x RS	1" IG	300 bar	175 mm	100 mm
120216	Rotating nozzle RTK100LT	2x TS 5x RS	1" IG	300 bar	95 mm	60 mm
120159	Rotating nozzle RTS100L	4x TS 3x RS	1" IG	300 bar	95 mm	60 mm
120171	Rotating nozzle RTV100LT	4x VS 3x RS	1" IG	300 bar	95 mm	60 mm
121521	Pocking nozzle CCP100	1x ZS 3x VS 6x RS	1" IG	300 bar	88 mm	50 mm
120442	Pocking nozzle CP100L	1x ZS 3x VS 6x RS	1" IG	300 bar	88 mm	50 mm
120202	Pocking nozzle CP100	1x ZS 4x VS 6x RS	1" IG	300 bar	185 mm	70 mm
120242	Twister AD1	1x ZS 4x RS	1" IG	300 bar	95 mm	55 mm
120141	Nozzle with front jet VDR100	1x ZS	1" IG	300 bar	85 mm	50 mm



120396



120302



120141



120787



120417



120088



120077



120087



120166



120225



120171



120159



120165



120216



121519



120436



121521



120442



120202



120242

# 1 1/4" Nozzles

Article no.	Description	Bore				
120303	Bulldozer BU125	14x RS	1 1/4" IG	300 bar	620 mm	300 mm
120768	Dump nozzle B250	10x RS	1 1/4" IG	300 bar	230 mm	110 mm
120692	Grenade B125/SP	10x RS	1 1/4" IG	300 bar	235 mm	110 mm
120074	Grenade S125	1x ZS 10x RS	1 1/4" IG	300 bar	140 mm	90 mm
120089	Grenade GB125	10x RS	1 1/4" IG	300 bar	230 mm	110 mm
120788	Plug nozzle TB80/125	10x RS	1 1/4" IG	300 bar	180 mm	80 mm
120418	Plug nozzle TB120/125	14x RS	1 1/4" IG	300 bar	200 mm	120 mm
120437	Tubular nozzle SN125	1x ZS 8x RS	1 1/4" IG	300 bar	105 mm	65 mm
120687	Rotating nozzle RTH125	7x RS	1 1/4" IG	300 bar	175 mm	100 mm
120690	Rotating nozzle RTK125T	2x TS 5x RS	1 1/4" IG	300 bar	180 mm	100 mm
120443	Pocking nozzle CP125L	1x ZS 3x VS 6x RS	1 1/4" IG	300 bar	100 mm	60 mm
120639	Pocking nozzle CP125	6x RS 4x VS	1 1/4" IG	300 bar	210 mm	80 mm



120303



120692



120074



120089



120768



120443



120639



120437



120690



120687



120788



120418

We equip the nozzles with suitable nozzle inserts: This is implemented in our workshop or, if requested, at your location.





# Accessories



# Channel Hooks and Manhole Cover Lifters



Channel hook SH-70

- Length: 70 cm
- Stainless steel
- Sharply curved at the bottom
- L-shaped

Article-No.: 190948



Manhole cover lifter „Titan-Alu“

- Facilitates opening of and enables hazard-free closing of manhole covers
- Suitable for oil separator, gas, water or cable manhole covers

Article-No.: 280330

# Sewer Test Color Uranin



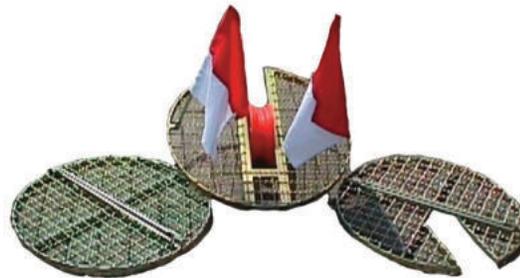
Available packaging sizes:

- 100 g
- 250 g
- 500 g
- 1000 g

Article-No.: 190418, 190967, 190955, 190417

# Manhole Grids

Article no.	Description	Ø
120195	Ventilation grid without cutout	650 mm
120196	Working grate with cutout	650 mm
120220	Working grate with cutout and flag	650 mm
120221	Working grate with deflection roller	650 mm
120222	Ventilation grid without cutout with flag	650 mm
121423	Working grate with deflection roller	800 mm
121476	Working grate with cutout	800 mm



# Sewer Mirrors

Available sizes:

- 285 x 150 mm
- 380 x 250 mm
- 540 x 250 mm

Spare glass panels and telescopic rods are available for all the sizes above!

Article-No.: 190795, 190786, 190783



# Deflection Devices

Article no.	Description
120148	Deflection device lower edge
120205	Banana long
120204	Banana short
120309	Banana mini
120149	Deflection device upper edge
240042	Work leash, length: 10 m
190934	Sewer hose guide



120148



190934



120204, 120205, 120309

# Traffic Cone Retro-Reflective

Traffic cone 500 mm / 750 mm high

- Completely reflective, with reflective ring
- Heavy foot
- Suitable for use in road traffic
- Approval according to: BASt 023 F03, 023 S02



Article-No.: 200055 (500 mm), 200015 (750 mm)

# Folding Warning Sign

- Leg length approx. 900 mm
- Setting up by spring mechanism
- Storage options with minimum space requirements



Article no.	Printing
330227	Sewage treatment
330352	Ultra high pressure water jetting
330368	TV investigation

# Warning Light Type Comet

- Suitable for construction site protection
- Operating with 6V block batteries (a maximum of two batteries can be installed) - not included
- Operating non-stop or with blinking light
- Light emission on both sides (yellow)
- BAST verified
- Suitable for assembly on traffic cones

Article-No.: 200101



# Peli-LED Cap Lamp 2690

- Explosion prevention appropriate for zone 0
- Color: black
- Single-handed switching on / off
- Safety-tested
- 74 lumen, light on time 11 hours
- Waterproof up to 1 m

Article-No.: 191108



# Hose Bridge

Rubber-made hose bridge designed for two hoses each DN 50, 75, 100 respectively size C, B and A.

Measurements: 307 x 865 x 80 mm

Weight: approx. 11.5 kg

- Interlocking connecting parts that simultaneously serve as a carrying handle
- Capable of adapting to unevenness on the floor
- Robust, highly wear-resistant rubber materials

Article-No.: 280377



# WD 40

Dose of 300 ml

Article-No.: 120758

Canister of 5 liters

Article-No.: 120422



# Portable Spotlight CEAG SEB 8 / SEB 8L

This explosion-protected portable spotlight was designed in accordance to DIN 14642 and is characterized by its alert function (emergency lamp) and its body made of impact-proof and abrasion-resistant polyamide. The portable spotlight is approved for ex-zones 1 and 2 in temperature class 4. If the main light's filament is broken, the ambient light switches on automatically.



- Swiveling lamp head
- Focusability of the light cone
- Microprocessor-controlled charge
- Flashing light and emergency light function
- SEB 8L comes with an internal charger
- Single-handed operation
- Ignition protection type E Ex e ib IIC T4
- Weight: 2.5kg (SEB 8L)
- Operating time approx. 5.5 hours
- Protected according to IP 65

Article No.: 200085 (SEB 8), 200084 (SEB 8L)

## Survivor Z1 LED



- Extremely robust body made of nylon with stable spring clip
- Three different types of lighting: normal lighting, economy lighting, flashing lighting
- Protected against splash water, dust and dirt
- Scratch-proof lens
- ATEX-approved: II 2GEX e Ib IIb T4
- Lighting duration: 3.5h (standard operation), 10h (economy operation)
- Measurements: 17.9x7.3x7.3 cm (HxWxD)
- Weight: 508 g
- Battery: NiCi 4.8V / 1.8 Ah
- Protected according to IP 65

Article-No.: 200042



# Sewer Cleaning



Damaged sewers not only pose a threat to the environment but also issue a challenge to renovation workers. In this regard, the materials to be used need to be adapted to the condition of the object in need of rehabilitation.

In our comprehensive assortment, you will most certainly find the right product for your need.

If mediocre working materials are utilized for sewer works on a daily basis, they pose a great threat to the user. In order to ensure an optimal workflow for the user, it is therefore essential to use products of selected manufacturers only. Accordingly, we offer you only those articles that are manufactured by high-quality and reliable partners who meet the strictest quality requirements and environmental standards.

All the materials used require DIBT approval; for us, this is a matter of course.

# In case there is a need for rehabilitation again ...



# Shortliners



# CarboLith PL 2K

## Scope of application:

Non-frothing, elasticized two-component resin with great adhesion, even on damp surfaces, for purposes of adhering partial inliners in sewer rehabilitation.

- Soaks glass fiber mats (Advantex) or polyester mats well
- Even adheres to damp surfaces
- Hardens well in thin layers
- Shuttering can be removed from the mold easily
- Even in cases of aggressive types of water, CarboLith PL 2K is resistant and does not saponify



CarboLith PL 2K is delivered in two components. As a three-component resin with variable dosage of the C-component for the purpose of controlling the setting speed, the system is also available under the name CarboLith PL.



## Advantages:

- DIBt approved
- Incorporated quickly: cycle time approx. 70 minutes
- No odor nuisance
- High strength
- Resistance to chemicals is particularly well
- Cost-efficient repair design

## Response data:

Mixture ratio A : B	100 : 200 volume parts	100 : 200 : 3.0	Test specification
Initial temperature	20 °C	15 °C	
Pot life (spreadability)	Approx. 8 min	10 min	
Setting time	Approx. 10 min	15 min	MCT PV 10-308
Deshuttering time	Approx. 50 min	60 min	

The data listed are laboratory values. Due to the heat exchange between resin and subsurface, surface condition and other factors, these values are subject to change during application. Whereas the pot life depends on material temperature in particular, the deshuttering time is highly contingent on the ambient temperature.

## Data on chemical media:

	Component A	Component B	Norm
Density at 25°C	1475 ± 50 kg/m <sup>3</sup>	1130 ± 40 kg/m <sup>3</sup>	DIN 12791
Color	Honey	Black/brown	DIN 53213
Flash point	None	>200°C	
Dynamic viscosity at 25°C	300 ± 140 mPa*s	150 ± 100 mPa*s	ISO 3219
pH-value	12-13	n.a.	DIN 19268

## Mechanical Properties of the Liner:

Ring stiffness vertex pressure test*	140	kPa	DIN EN 1228	2
E-modulus vertex pressure test*	9000	MPa	DIN EN 1228	2
Ring stiffness vertex pressure test short-time** (S <sub>0</sub> )	2,6	kPa	DIN EN 1228	6
E-modulus vertex pressure test short-time**	14500	MPa	DIN EN 1228	6
E-modulus vertex pressure test 400d**	8800	MPa	DIN EN 1228, DIN EN 761	6
Bending strength axial	140	MPa	DIN EN ISO 178	4, 6
Bending E-modulus axial	5600	MPa	DIN EN ISO 178	4
Bending strength radial	120	MPa	DIN EN ISO 178	4
Bending E-modulus radial	5500	MPa	DIN EN ISO 178	4
Tearing strength (glass and stoneware)	2,2	MPa	DIN EN ISO 4624	5
Tearing strength (glass and stoneware)	3,3	MPa	DIN EN ISO 4624	6

\*Inside pipe diameter 150 mm, liner diameter 4 mm

\*\*Inside pipe diameter 300 mm, liner diameter 4 mm

(The values are obtained from sophisticated reports and shall be regarded as orientation values.)

### Delivery form:

Bundles consisting of:

Component A

10 l = 14.75 kg inside a tinplate canister

250 ml = 0.37 kg inside a tinplate can

Component B

20 l = 22.6 kg inside a tinplate canister

500 ml = 0.57 kg inside a tinplate can

Other forms of delivery on request

### Approval and reports:

DIBt approval

Drinking water and ground water hygiene testing (Institute of Hygiene, Gelsenkirchen)

Liner material testing for partial rehabilitation purposes (Engineering office Seibert, Oststeinbek)

### Article numbers:

Carbolith 2K Summer 35kg Container = **160317**

Carbolith 2K Winter 35kg Container = **160318**

# Carbolith PL 3K

## Scope of application:

Non-frothing, elasticized three-component resin with great adhesion, even on damp surfaces, for purposes of adhering partial inliners in sewer rehabilitation.

- Soaks glass fiber mats (Advantex) or polyester mats well
- Even adheres to damp surfaces
- Does not foam, even in cases of ingress of water
- Hardens well in thin layers
- Shuttering can be removed from the mold easily
- Even in cases of aggressive types of water, CarboLith PL 3K is resistant and does not saponify

Carbolith PL is delivered in three components. Component C is conducive to adjusting the setting behavior.

Mixture ratio A:B:C	100:200:2.0 volume parts	100:200:3.0 volume parts	100:200:3.75 volume parts	100:200:4.0 volume parts
Initial temperature	20°C	15°C	15°C	15°C
Pod life (spreadability)	approx. 10 min	approx. 10 min	approx. 10 min	approx. 8 min
Setting time	approx. 20 min	approx. 20 min	approx. 20 min	approx. 10 min
Deshuttering time	approx. 60 min	approx. 60 min	approx. 60 min	approx. 50 min

	Component A	Component B	Component C
Density at 25°C	1490 ± 25 kg/m <sup>3</sup>	1130 ± 20 kg/m <sup>3</sup>	1120 ± 20 kg/m <sup>3</sup>
Color	colorless	dark brown	brown
Flash point	none	>200°C	100°C
Dynamic viscosity at 25°C	270 ± 70 mPa*s	150 ± 30 mPa*s	40 ± 5 mPa*s

## Delivery form:

Component A	Component B	Component C
28 kg (tinplate container)	21 kg (tinplate container)	5 kg (tinplate container)



# Willkat PL 2K

## Scope of application:

Non-frothing, elasticized two-component resin with great adhesion, even on damp surfaces, for the purposes of rehabilitation and sealing of sewer tunnels and pipes.

- Soaks glass fiber mats (Advantex) or polyester mats well
- Even adheres to damp surfaces
- Does not foam, even in cases of ingress of water
- Hardens well in thin layers
- Shuttering can be removed from the mold easily

Willkat PL 2K is delivered in two components. As a three-component resin with variable dosage of the C-component for the purpose of controlling the setting speed, the system is also available under the name Willkat PL.

## Advantages:

- Incorporated quickly: Cycle time approximately 60 minutes
- No odor nuisance
- Cost-efficient repair design

## Delivery form:

Bundle consisting of:

Component A

10 l = 14.9 kg inside a tinplate canister

250 ml = 0.37 kg inside a tinplate can

Component B

20 l = 22.6 kg inside a tinplate canister

500 ml = 0.57 kg inside a tinplate can

Other forms of delivery on request

## Approval and reports:

DIBt approval

Drinking water and ground water hygiene testing (Institute of Hygiene, Gelsenkirchen)

Liner material testing for partial rehabilitation purposes (engineering office Seibert, Oststeinbek)

*For additional information see table on page 53*

*(Summer = 1% C-component // Winter = 3% C-component)*

## Article numbers:

Willkat 2K Summer 35kg Container = **160417**

Willkat 2K Winter 35kg Container = **160416**

# Willkat PL 3K

## Scope of application:

Non-frothing, elasticized three-component resin with great adhesion, even on damp surfaces, for the purposes of rehabilitation and sealing of sewer tunnels and pipes relying on short liner processes in the context of sewer cleaning.

- Soaks glass fiber mats (Advantex) or polyester mats well
- Even adheres to damp surfaces
- Does not foam, even in cases of ingress of water
- Hardens well in thin layers
- Shuttering can be removed from the mold easily

Willkat PL is delivered in three components. The C-component is conducive to adjusting the setting behavior.

Mixture ratio A:B:C	100:200:0 volume parts	100:200:1 volume parts	100:200:3 volume parts	100:200:4 volume parts
Initial temperature	15/20/25/30 (°C)	5/10/15/20/25 (°C)	5/10/15/20/25 (°C)	5/10 (°C)
Pod time (spreadability)	21/18/18/16 (min)	23/17/16/15/12 (min)	16/12/11/9/7 (min)	13/7 (min)
Setting time	35/28/26/24 (min)	31/28/27/25/22 (min)	21/17/15/13/10 (min)	17/10 (min)
Deshuttering time	150/120/90/70 (min)	180/90/60/60/50 (min)	90/60/55/50/45 (min)	60/55 (min)

	Component A	Component B	Component C
Density at 23°C	approx. 1,48 g/cm³	approx. 1,13 g/cm³	approx. 1,11 g/cm³
Dynamic viscosity at 23°C	approx. 300 mPa*s	approx. 170 mPa*s	approx. 34 mPa*s
Color	colorless	dark brown	light brown
pH-value	approx. 12	n.a.	>12
Flash point	-	> 200°C	> 80°C

## Delivery form:

Component A	Component B	Component C
28 kg (tinplate container)	21 kg (tinplate container)	1 kg (tinplate container)



# Saertex Glass Fiber Laminate

We provide you with the original Advantex glass fiber laminate. The laminate can already be cut into proper roll lengths to ensure a fit with the various pipe and sewer dimensions. It goes without saying that our glass fiber laminate is DIBt approved with respect to all the resins available from us.



## Article numbers:

Width	1,086 gr./m <sup>2</sup>	1,387 gr./m <sup>2</sup>	1,547 gr./m <sup>2</sup>
0.35 m	150243	150240	-
0.44 m	150244	150241	-
0.53 m	150245	150242	-
0.65 m	150183	150220	-
1.30 m	150113	150165	150077

There are color stripes in the middle of the glass fiber laminate, that are embroidered into the laminate. Due to these color combinations, rolls with different surface weights can be differentiated:

1086 g/m<sup>2</sup> = black / red

1387 g/m<sup>2</sup> = green / red

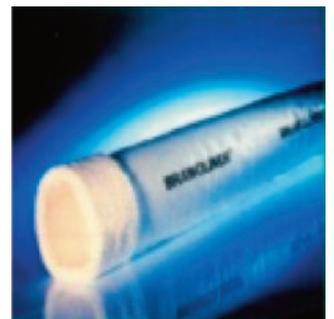
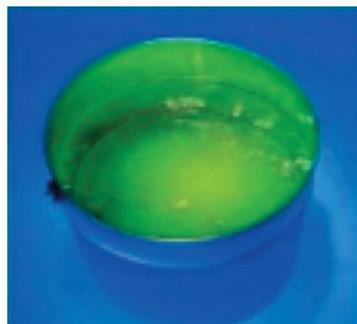
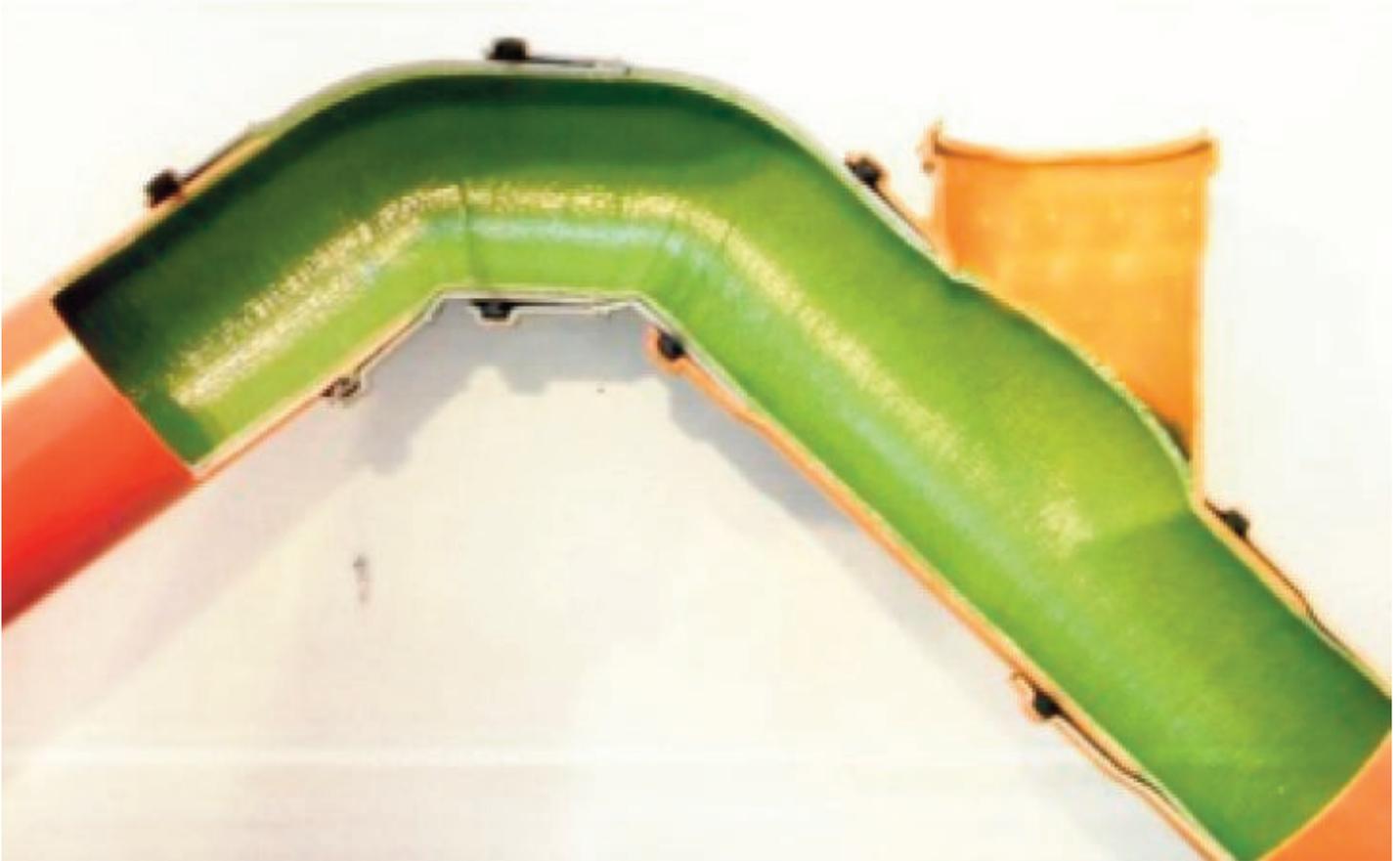
1547 g/m<sup>2</sup> = blue / red

## Bend Rehabilitation Laminate

For bends up to 90°, we can provide you with bend rehabilitation laminate. It has a weight of 1,030 g/m<sup>2</sup> and a roll width of 62.5 cm. The corresponding article number is **150273**.



# Longliners



# Brawoliner

Our offering includes the entire Brawoliner assortment. From hose liners to resins, you can find every product in our assortment for the purposes of road rehabilitation projects.

Our stock assortment encompasses:



## Brawoliner (Standard)

Length	DN 100	DN 125	DN 150	DN 200
25 meters	200133-25	200134-25	200135-25	200136-25
50 meters	200133-50	200134-50	200135-50	200136-50
100 meters	200133	200134	200135	200136

## Brawoliner 3D

Length	DN 70	DN 100	DN 150
25 meters	200170-25	200152-25	200157-25
50 meters	200170-50	200152-50	200157-50
100 meters	200170	200152	200157

## Brawoliner XT

Length	DN 125	DN 150	DN 200
25 meters	200166-25	200167-25	200168-25
50 meters	200166-50	200167-50	200168-50
100 meters	200166	200167	200168

## Brawo-Harz (10 kg Bucket)

Article numbers	Brawo I	Brawo III
	200139	200138
	(fast-curing)	(slow-curing)

Of course, we can also provide you with all the other items incorporated into the Brawo assortment. If you have any requests, please do not hesitate to get in touch with our sales representatives.

# Brawo I

Two-component resin to impregnate laminates, felts and part liners in the area of sewage technology.

- **Product description:** low-viscosity, chemical-resistant epoxy resin for the purpose of overhauling permanently damp components in the area of sewage management.
- **Product characteristics:** high strength; two-component epoxy resin with great resistance to acids and bases; applicable even in cases of damp and mineral surfaces (e.g. sewer pipes) or metal subfloors; great adhesion on concrete, bricks and pottery; physiologically harmless (after hardening)
- **Scope of application:** suitable for soaking and fulling into felt fabric, glass fiber backing fabric and reinforcement fabric for the purpose of overhauling defective pipes, sewers and old sewage technology structures.



## Technical data:

(In case no additional information is given, all values relate to 20°C and 50% relative humidity.)

Base	Exposy resin
Color	Green
Number of components	Two
Mixture ratio	3:1
Specific weight	1.1 kg/l
Pot life with respect to a charge of 100 g at approx. +10°C material temperature and +20°C air temperature	22 minutes till temperature rises to +40°C
Pot life with respect to a charge of 100 g at approx. +20°C material temperature and +20°C air temperature	18 minutes till temperature rises to +40°C
Container processing time 10 kg at +15°C material / air temperature	15 minutes till temperature rises to +40°C
Processing time of the soaked fibre laid out lengthwise	Approx. 50 minutes at 15°C
Hardening time of the fibre at 10°C soaked into a felt layer of 3 mm	After 13 hours without ground water After 20 hours with ground water
Consumption	Usually 0.95 l/mm fibre thickness and m <sup>2</sup>
Chemically robust	After 7 days
Processing conditions	+10°C to +30°C air und subsurface temperature
Detergent	MC detergent U

High (low) temperatures shorten (lengthen) all the time intervals specified. In general, a change in temperature of 10°C halves or doubles the intervals specified. Both components are subject to marking according to the Ordinance on Hazardous Substances. The information and advice on delivery containers need to be taken into account during processing.

# Brawo III

Two-component resin to impregnate laminates, felts and part liners in the area of sewage technology.

- **Product description:** low-viscosity, chemical-resistant epoxy resin for the purpose of overhauling permanently damp components in the area of sewage management.
- **Product characteristics:** high strength; two-component epoxy resin with great resistance to acids and bases; applicable even in cases of damp and mineral substrates (e.g. sewer pipes) or metal subfloors; great adhesion on concrete, bricks and pottery; physiologically harmless (after hardening)
- **Scope of application:** suitable for soaking and fulling into felt fabric, glass fiber backing fabric and reinforcement fabric for the purpose of overhauling defective pipes, sewers and old sewage technology structures.



## Technical data:

(In case no additional information is given, all values relate to 20°C and 50% relative humidity.)

Base	Epoxy resin
Color	Green
Number of components	Two
Mixture ratio	3:1
Specific weight	1.1 kg/l
Pot life with respect to a charge of 100 g at approx. +10°C material temperature and +20°C air temperature	85 minutes till temperature rises to +40°C
Pot life with respect to a charge of 100 g at approx. +20°C material temperature and +20°C air temperature	77 minutes till temperature rises to +40°C
Container processing time 10 kg at +15°C material / air temperature	60 minutes till temperature rises to +40°C
Processing time of the soaked fibre laid out lengthwise	Approx. 3.5 hours at 15°C
Hardening time of the fibre at 10°C soaked into a felt layer of 3 mm	After 24 hours without ground water
	After 36 hours with ground water
Hardening time of the soaked fiber in case of heat curing	Approx. 3 hours at 50°C
Consumption	Usually 0.95 l/mm fibre thickness and m <sup>2</sup>
Chemically robust	After 7 days
Processing conditions	+10°C to +30°C air and subsurface temperature
Detergent	MC detergent U

High (low) temperatures shorten (lengthen) all the time intervals specified. In general, a change in temperature of 10°C halves or doubles the intervals specified. Both components are subject to marking according to the Ordinance on Hazardous Substances. The information and advice on delivery containers need to be taken into account during processing.

# Calibration Hoses

Calibration hoses can be utilized as an auxiliary means for installation purposes in route rehabilitation. These enable a rehabilitation with an open end if there is either a particular part of the pipe that needs to be redeveloped or there is no possibility to open the liner afterwards.



## Beige (unstitched, up to 80°C, bendable up to 90°)

Article numbers	Nominal width	
282714-50	DN 100	50 m
282714-100	DN 100	100 m
282715-50	DN 125	50 m
282715-100	DN 125	100 m
282716-50	DN 150	50 m
282716-100	DN 150	100 m
282717-50	DN 200	50 m
282717-100	DN 200	100 m

## Orange (welded, up to 80°C, bendable up to 90°)

Article numbers	Nominal width	
282331-50	DN 100	50 m
282331	DN 100	100 m
282332-50	DN 125	50 m
282332	DN 125	100 m
282333-50	DN 150	50 m
282333	DN 150	100 m
282334-50	DN 200	50 m
282334	DN 200	100 m
282335-50	DN 250	50 m
282335	DN 250	100 m
282336-50	DN 300	50 m
282336	DN 300	100 m

## Purple (welded, up to 50°C, extremely bendable)

Article numbers	Nominal width	
281853	DN 100	Goods sold by the meter (maximum of 100 m)
281854	DN 125	Goods sold by the meter (maximum of 100 m)
281855	DN 150	Goods sold by the meter (maximum of 100 m)
281856	DN 200	Goods sold by the meter (maximum of 100 m)

# Kraso Inversion Drums

With Kraso Inversion Drums, you can rehabilitate underground pipes up to DN 200.

- Kraso-Drum 600 inversion drum
- Outside diameter 600mm
- Drum made of stainless steel
- Comes with carrying handles
- Has two inspection windows
- Two wheels for transportation purposes
- Jogwheel with locking brake
- Shaft with grommet for a support strap
- Water point effected by means of the shaft
- Ball valve ½" for drainage purposes
- Safety valve 1.5 bar
- Shop air with pressure controller

## Components:

- TGS vacuum pump
- Kraso-Walk-200 KH resin infusion system
- Kraso-Walk base frame
- Kraso-Therm-100 heating system



In case you need more detailed information, please do not hesitate to get in touch with our sales team!

# Packers



# Sava House Connection Packers

In the area of rehabilitation, Sava house connection packers are part of the basic equipment. Their standard working pressure is 2.5 bar. By default, they are equipped with safety couplings by Steinco.



Article numbers	Nominal width	
270717	70/100	600 mm
270718	70/100	1000 mm
270719	70/100	1500 mm
270720	70/100	2000 mm
270721	70/100	3000 mm
270722	70/100	4000 mm
270723	70/100	5000 mm
270309	150/200	600 mm
270310	150/200	1000 mm
270311	150/200	1500 mm
270312	150/200	2000 mm
270313	150/200	3000 mm
270374	150/200	4000 mm
270314	150/200	5000 mm

# Sava Bend Packers

Sava bend packers start to work particularly well at a point other packers quickly reach their limits. Short 90° bends are their specialty and do not pose a problem to them at all.



Article number	Nominal width	
270396	70-80	1000 mm
270397	70-80	1500 mm
270398	100-125	1000 mm
270399	100-125	1500 mm
270400	150-165	1000 mm
270401	150-165	1500 mm
270402	180-205	1000 mm
270403	180-205	1500 mm

# HFH Multi Rehabilitation Packers

HFH Multi Rehabilitation Packers are characterized by their great dimensional leaps. Due to their shape stability, they additionally have a very good sliding behavior. The maximum working pressure is 3.0 bar.



Article number	Nominal width	
240404	50-150	1000 mm
240405	50-150	2000 mm
240406	50-150	3000 mm
240407	70-200	1000 mm
240408	70-200	2000 mm
240409	70-200	3000 mm

# Trelleborg House Connection Packers

House connection packers by Trelleborg are part of the basic equipment in the area of rehabilitation. By default, they have a working pressure of 2.5 bar and are already equipped with safety couplings by Steinco.



Article number	Nominal width	
240743	70/100	600 mm
240700	70/100	1000 mm
240701	70/100	1500 mm
240702	70/100	2000 mm
240703	70/100	2500 mm
240704	70/100	3000 mm
240705	70/100	4000 mm
240706	70/100	5000 mm
240745	80/150	600 mm
240746	80/150	1000 mm
240747	80/150	1500 mm
240748	80/150	2000 mm
240749	80/150	3000 mm
240750	80/150	4000 mm
240751	80/150	5000 mm
240744	150/200	600 mm
240715	150/200	1000 mm
240716	150/200	1500 mm
240717	150/200	2000mm
240718	150/200	2500 mm
240719	150/200	3000 mm
240720	150/200	4000 mm
240721	150/200	5000 mm

# Sava Test Sealing Cushions

Test sealing cushions are characterized by their economical construction. Up to a size of 200 mm, they are equipped with a car tire inflation valve that is integrated into the plug. Plugs of other sizes are endowed with quick couplings. Eyelet rings on the plugs facilitate lifting and lowering.



## Test Sealing Cushions

Article no.	Scope of application Min. Ø / Max. Ø					Bypass-Interior - Ø
270150	100/200	2.5 bar	2.60 kg	350 mm	68 mm	1"
270151	150/300	2.5 bar	4.40 kg	590 mm	142 mm	1"
270152	200/400	2.5 bar	6.30 kg	635 mm	192 mm	2"
270153	350/600	2.5 bar	16.60 kg	868 mm	322 mm	2"
270161	500/800	2.5 bar	31.30 kg	1185 mm	472 mm	2"
270120	500/1000	1.5 bar	31.30 kg	1185 mm	472 mm	2"

## Test Sealing Cushions Short

Article no.	Scope of application Min. Ø / Max. Ø					Bypass-Interior - Ø
270154	46/52	2.5 bar	0.17 kg	110 mm	45 mm	1/8"
270155	71/77	2.5 bar	0.32 kg	115 mm	70 mm	1/2"
270156	86/102	2.5 bar	0.59 kg	175 mm	85 mm	1/2"
270157	143/153	2.5 bar	1.88 kg	220 mm	142 mm	1"
270158	71/102	2.5 bar	0.35 kg	130 mm	70 mm	1/2"
270159	86/153	2.5 bar	0.63 kg	195 mm	85 mm	1/2"
270160	143/204	2.5 bar	2.03 kg	250 mm	142 mm	1"

Further test sealing cushions are available on request.

# Sava Sealing Pipe Cushions

These plugs are characterized by their economical construction. Up to a size of 200 mm, they are equipped with a car tire inflation valve that is integrated into the plug. Plugs of other sizes are endowed with quick couplings. Eyelet rings on the plugs facilitate lifting and lowering.



## Sealing Pipe Cushions

Article no.	Scope of application Min Ø / Max. Ø		 kg		
<b>270130</b>	100/200	2.5 bar	1.12 kg	535 mm	92 mm
<b>270131</b>	150/300	2.5 bar	1.90 kg	575 mm	142 mm
<b>270132</b>	200/400	2.5 bar	3.00 kg	635 mm	192 mm
<b>270133</b>	350/600	2.5 bar	8.40 kg	865 mm	322 mm
<b>270103</b>	500/1000	1.5 bar	17.30 kg	1185 mm	472 mm

## Sealing Pipe Cushions Short

Article no.	Scope of application Min Ø / Max. Ø		 kg		
<b>270135</b>	46/52	2.5 bar	0.11 kg	102 mm	45 mm
<b>270136</b>	71/77	2.5 bar	0.23 kg	115 mm	70 mm
<b>270137</b>	86/102	2.5 bar	0.39 kg	175 mm	85 mm
<b>270139</b>	46/77	2.5 bar	0.11 kg	110 mm	45 mm
<b>270140</b>	71/102	2.5 bar	0.250 kg	130 mm	70 mm
<b>270141</b>	86/153	2.5 bar	0.42 kg	195 mm	85 mm
<b>270142</b>	143/204	2.5 bar	1.32 kg	250 mm	142 mm

Further sealing pipe cushions are available on request.

# Trelleborg Test Sealing Cushions

These test sealing pipes have a flexible pass-through. They are equipped with quick couplings for the purposes of inflating and draining. Moreover, they have an eyelet to secure the test sealing cushion.



## Test Sealing Cushions

Article no.	Scope of application Min Ø / Max. Ø		 kg			Bypass-Interior-Ø
261638	100/200	2.0 bar	3.00 kg	500 mm	95 mm	1"
261639	200/400	2.0 bar	8.00 kg	500 mm	180 mm	2"
261640	300/600	2.0 bar	17.00 kg	700 mm	290 mm	2"
261641	500/1000	2.0 bar	52.00 kg	1350 mm	440 mm	2"
261642	500/1200	2.0 bar	60.00 kg	1650 mm	440 mm	4"
261643	500/1400	1.5 bar	95.00 kg	2300 mm	490 mm	4"
261644	700/1600	1.0 bar	180.00 kg	2700 mm	580 mm	4"
261645	800/2000	1.0 bar	235.00 kg	3500 mm	780 mm	4"

Further test sealing cushions are available on request.

# Trelleborg Pipe Sealing Cushions

These pipe sealing cushions are characterized by their economical construction. They are endowed with quick couplings for the purposes of inflating and draining. Moreover, they have an eyelet to secure the test sealing cushion.



## Pipe Sealing Cushions

Article no.	Scope of application Min Ø / Max. Ø				
<b>261630</b>	40/70	1.5 bar	0.35 kg	160 mm	35 mm
<b>261631</b>	70/150	1.5 bar	0.55 kg	320 mm	65 mm
<b>261633</b>	100/200	3.0 bar	4.40 kg	500 mm	95 mm
<b>261701</b>	250/300	3.0 bar	2.20 kg	500 mm	140 mm
<b>261634</b>	200/400	3.0 bar	8.80 kg	500 mm	180 mm
<b>261635</b>	300/600	3.0 bar	9.00 kg	700 mm	290 mm
<b>261636</b>	500/1000	3.0 bar	44.10 kg	1000 mm	460 mm
<b>261637</b>	500/1200	3.0 bar	52.00 kg	1650 mm	440 mm

Further pipe sealing cushions are available on request.



# Accessories



# Scissors for Glass Fiber Mats

Special scissors 10" with tothing for glass fiber mats

Article-No.: 281793



# Universal Mixer (Blunger)

Universal mixer (blunger), lacquered steel, length of 620 mm, diameter of 100 mm

Article-No.: 210077



# Net Tubings for Rehabilitation Packers

Net tubing adhering rehabilitation packers in various sizes

Article no.	DN		Size
270732	100	25 m	I
270733	150	25 m	II
270734	200	25 m	III
270735	300	25 m	IV
270736	400	25 m	V



# Spatula

Resin spatula with wooden handle, steal leaf 400 mm wide

Article-No.: 160251

PVC spatula 27.5 mm, elastic and unbreakable synthetic material

Article-No.: 330385



# Resin Remover

150 ml spray can, suitable inter alia for epoxy, silicate, methacrylate

Article-No.: 160275



# Fabric Tape

Special lacquer coating  
Silver  
50 meters x 50 mm

Article-No.: 150061



# Wrapping Wire

Wrapping wire 100 g for shortliners

Article-No.: 330383



# Films

Article no.	Description		Width	Diameter
140031	Transparent on rolls	500 m	2.0 m	120 µm
140037	Transparent on rolls	500 m	4.0 m	120 µm
140158	Stretch film transparent	300 m	0.5 m	15 µm



# Disposable Gloves

Article no.	Description	Size
160335-M	Latex, powder-free, dispenser box of 100 pieces	8
160335-L	Latex, powder-free, dispenser box of 100 pieces	9
160335-XL	Latex, powder-free, dispenser box of 100 pieces	10
160327-M	Vinyl, powdered, dispenser box of pieces	8
160327-L	Vinyl, powdered, dispenser box of pieces	9
160327-XL	Vinyl, powdered, dispenser box of pieces	10



## Air Push Rods

Our air push rods are available in three different hardness grades and are already equipped with safety couplings by Steinco.

- White = Hard
- Blue = Medium
- Red = Flexible

### White:

Article number	∅	
200094	18 mm	1500 mm
200022	18 mm	3000 mm
200037	21 mm	1500 mm
200132	21 mm	3000 mm



### Red:

Article number	∅	
200163	18 mm	500 mm
200164	18 mm	1000 mm
200158	18 mm	1500 mm
200165	18 mm	2000 mm
200159	18 mm	3000 mm



### Blue:

Article number	∅	
170018	20 mm	1500 mm
170019	20 mm	3000 mm



# Notizen

# Notes

# Notes

# Notes

# Notes

# Our General Terms and Conditions

## § 1 Application of Conditions

Our deliveries, services and offerings are carried out on the basis of these terms and conditions only. Therefore, they also apply to all future business relationships, even if they are not expressly declared again. These terms and conditions are considered as being accepted at latest at the moment goods and services are received. Confirmations to the contrary on the part of the buyer with reference to his business and purchasing conditions respectively are hereby rejected. Deviating from these terms and conditions is valid if and only if we confirm them in written form.

## § 2 Offer and Contract Conclusion

1. Our offers are nonobligatory and nonbinding. To be legally valid, declarations of acceptance as well as all the orders require our written or telex confirmation. The same applies to appendices, modifications, or additional agreements.
2. Drafts, illustrations, measurements, weights or other performance characteristics are valid if and only if expressly agreed on in written form.

## § 3 Prices

1. Unless stated otherwise, we commit ourselves to the prices specified in our offers for 30 days beginning with the quotation date. The prices explicitly stated in our order confirmation plus value-added tax are determinative of our pricing decision. Additional deliveries and services will be charged separately.
2. Unless otherwise agreed upon, our prices are calculated ex works Hilden, excluding packaging.

## § 4 Delivery Time and Time of Performance

1. Whether agreed upon bindingly or nonbindingly, term of delivery and date of delivery need to be made in writing.
2. We do not assume responsibility for delivery delays or delayed service provision due to force majeure and due to events that make delivery significantly more difficult or impossible for us – these include, in particular, strikes, lockouts, regulatory actions etc., irrespective of whether they occur with us, our suppliers, or our sub-suppliers – even if we agreed on deadlines and dates bindingly. In these cases, we are authorized to either (i) defer delivery or service provision by the number of days the obstruction took place plus a reasonable starting period or (ii) withdraw from the contract in whole or in part due to the part of delivery or service provision that has yet not been fulfilled.
3. If the obstruction lasts longer than three months, the buyer is entitled to withdraw from the part of the contract that has yet not been fulfilled after setting an adequate grace period. However, the buyer cannot derive any claims for damages if delivery time is extended or we are released from our obligation. We can appeal to these circumstances mentioned if and only if we give notice to the buyer immediately.
4. If we are responsible for a failure to comply with deadlines or dates we bindingly agreed upon or if we are in default, the buyer is entitled to insist upon compensation for delayed completion in the amount of 0.5% for each week completed after default, but in total up to 5% of the effective invoice amount of those deliveries and services that are affected by the default. Any further claims are ruled out, unless the default is based on at least gross negligence.
5. We are entitled to make partial delivery at any time.

## § 5 Passing of Risk

The risk demises to the buyer as soon as the shipment has been handed over to the person responsible for carrying out the transport or has left our warehouse for the purpose of shipment. If shipping is impossible independent of negligence on behalf of our side, the risk is demised to the buyer with the notice of readiness for shipment.

## § 6 Implied Warranty

1. We ensure that our products are not subject to manufacturing and material defects; warranty period is three months.
2. The warranty period begins with the date of delivery.
3. In case of defects, the buyer needs to inform us in written form immediately or, at the latest, one week after receiving the delivery item. Defects that are undetectable within this period, even in case of careful inspection, must be reported to us in written form immediately after they have been detected.
4. If the buyer communicates to us that our products do not comply with the warranty, then after having made a decision, we request that
  - a) defective pieces be sent to us for remedy and subsequent return or
  - b) the buyer keep ready the defective pieces for the purpose of inspection and, where appropriate, remedy by ourselves or a third party commissioned by us.
5. If the remedy fails after a reasonable period, the buyer has the choice to demand either rescission of pay or cancellation of the contract.
6. Eine Haftung für normale Abnutzung ist ausgeschlossen. 6. Liability for usual wear and tear is excluded.
7. Warranty claims against us are entitled to the direct buyer only and are not transferable.
8. The preceding paragraphs conclusively contain the warranty for our products and exclude other warranty claims of any kind. This applies in particular to the restitution of consequential harms caused by a defective product.

## § 7 Reservation of Proprietary Rights

1. Till conformance to all the accounts receivable (including all the current account balance claims), that are entitled to us against the buyer for any legal reason now or in the future, the following securities are available to us and will release upon request at our discretion, insofar as their value exceeds the claims by more than 20%.
2. The goods remain our property. Processing or transformation is carried out for us as the manufacturer, but without any obligation on our part. If our (joint) property expires as a result of combination, it is already stipulated that the buyer's (joint) property of the homogenous good demises to us in proportion to its invoice value. The buyer stores our (joint) property without valuable consideration. Goods to which we have (joint) ownership are referred to below as goods subject to retention of title.
3. The buyer is entitled to process and sell the goods subject to retention of title in the ordinary course of business, as long as the buyer is not in default. Pledging or chattel mortgage are prohibited. As a precaution, the buyer assigns to us the accounts receivable resulting from the resale or any other legal reason (insurance, tortious act) with regards to the goods subject to retention of title (including all the current balance claims) to their full extent. We precariously authorize the buyer to collect the receivables assigned to us for our account in their own name. This direct debit authority can be revoked if and only if the buyer does not meet their payment obligations in proper form.

4. If third parties access goods subject to retention of title, the buyer will point at our ownership and notify us immediately.
5. If the buyer acts contrary to contract – in particular default of payment – we are entitled to take back the goods subject to retention of title or, if necessary, call for assignment of the buyer's claims for restitution against third parties. Revoking or seizing the goods subject to retention of title by us does not constitute a withdrawal from the contract, unless the Abzahlungsgesetz applies.

## **§ 8 Payment**

1. In spite of contrary provisions of the buyer, we are entitled to initially offset payments against the buyer's older debts. If costs and interests have already accrued, we are entitled to offset the payment against the costs first, then against the interest and finally against the main service.
2. A payment is considered to have been made when we can dispose of the amount. In case of checks, the payment is considered to have been made when the check is cashed.
3. If the buyer is in default, we are entitled to charge interest at the rate calculated by the commercial banks for open overdrafts from the point of time the buyer is in default. They are to be set lower if the buyer can prove a lower burden.
4. If the buyer does not meet their payment obligations, in particular does not cash a check or suspends their payments, or if we become aware of other circumstances that call the buyer's creditworthiness into question, we are entitled to accelerate the entire remaining debt, even if we accepted checks. In this case, we are moreover entitled to request advance payment or a surety.
5. The buyer is entitled to offset, withhold, or reduce the price, even if notifications of defects or counterclaims are asserted, if and only if the counterclaims are legally binding or undisputed.

## **§ 9 Sales Return**

1. We charge a handling fee of 15% of the net value of the goods for the expenses in connection with a return delivery, which cannot be attributed to a fault on our part (e.g. wrong delivery, delivery of faulty or defective goods etc.). Expenses in connection with a return delivery include incoming goods inspection and testing, re-storage and return to the supplier.
2. Moreover, we charge any transport, freight and packaging costs associated with a return delivery in accordance with paragraph 1.
3. Costs associated with damages during goods' return transport must be borne by the buyer.

## **§ 10 Limitation of Liability**

Claims for damages based on impossibility of performance, positive violation of a contractual duty, culpa in contrahendo and tortious act are excluded both against us and against vicarious agents, unless intentional or grossly negligent conduct is involved.

## § 11 Applicable Law, Court of Jurisdiction, Partial Nullity

1. These terms and conditions and the entire legal relationship between the buyer and us are subject to the law of the Federal Republic of Germany. The applicability of the Uniform Law on the International Sale of Goods is excluded.
2. If the buyer is a registered trader within the meaning of the German Commercial Code, a corporate body under public law or public separate estate, Langenfeld is the exclusive place of jurisdiction for all the disputes arising from the contractual relationship directly or indirectly.
3. If a provision in these terms and conditions or a provision in the context of other agreements is or becomes ineffective, the validity of the other provisions or agreements is not affected.

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# Frauenhof

*Gegründet 1887*